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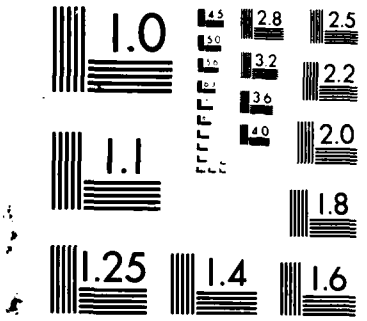

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AFOSR-TR- 86-1080

Final Report

to

The Air Force Office of Scientific Research

for

LOW-FREQUENCY ACOUSTIC MICROSCOPE

Contract No. AFOSR-84-0198

Principal Investigator:
B. T. Khuri-Yakub

G. L. Report No. 4051

May 1986

Edward L. Ginzton Laboratory
W. W. Hansen Laboratories of Physics
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ABSTRACT

Low-frequency acoustic microscopy has demonstrated a tremendous potential for the nondestructive evaluation of metals, composite materials, and structural ceramics. We demonstrated, on an earlier instrument, that it is possible to detect small subsurface defects in metals, in composite materials, and in sintered ceramics. The location and depth of a defect below the surface was determined by virtue of the scanning capability of the microscope, and the excellent depth of field obtained by the sharply focused transducers. Such instruments will have a significant impact on the nondestructive evaluation of structural materials.

This proposal allowed us to build a new, improved instrument with which we can make not only amplitude, but also phase, measurements. The addition of the phase measurement capability allows us to do two-dimensional image processing to extract more information from our measurements than is presently done with amplitude-only acoustic microscopes. Also, the addition of the phase measurement capability allows us to measure profiles of samples with great accuracies.

The DOD-URIP program has been an excellent vehicle for us to develop this capability that will improve the state of the art of nondestructive evaluation in the country.

LOW-FREQUENCY ACOUSTIC MICROSCOPE

B. T. Khuri-Yakub

This equipment grant was used to acquire the necessary instrumentation to put together an acoustic microscope that operates in the frequency range of 1-100 MHz .

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